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THE CURE OF EPILEPSY

AND OF

INVETERATE UTERINE DISPLACEMENTS

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AN ATTEMPT TO CURE EPILEPSY BY LIGATURE OF THE CAROTID OR VERTEBRAL ARTERIES;

WITH REPORT OF SOME CASES IN WHICH LIGATURE OF ONE OR BOTH OF THESE VESSELS WAS PERFORMED.

Epilepsy has, from the remotest historical time until the present, been a comparatively frequent and a much dreaded disease. Up to very recent years the subjects of it were supposed to be either under Divine punishment or possessed by devils, and the cure was sought for naturally in priestcraft, witchcraft, or astrology. We do not hear much now of sidereal combinations, but amulets are still worn by epileptics, and in many districts priests and holy places are still credited with power to cure this disease.

Turning from popular to scientific medicine, we find that the symptoms of epilepsy have received much attention within the past few years. The morbid anatomy of patients who have died from it has been narrowly scrutinised by the most powerful microscopes of our most clever pathologists, and much progress has been made in this direction in telling us what essential epilepsy *is not.* It is not the result of a tumour, for that is not always found. It is not the result of sclerosis of particular regions, but the sclerosis is probably the result of the epilepsy, etc.

What the disease is, is still a theoretical consideration. According to some, the phenomena exhibited in what is called an epileptic fit are due to a nerve-storm raging somewhere amongst the grey matter of the cerebral convolutions. This storm causes the muscular apparatus of the body to vibrate in a peculiar manner, just as an electrical storm causes the telegraph needle to vibrate spontaneously and irregularly.

According to others, the subjects of epilepsy are afflicted with a hyper-sensitive medulla. According to them, reflex phenomena produced by gastric or other irritation causes vaso-motor disturbances and consequent changes that explain the epileptic symptoms.

Many other theories have been broached, and many of them are interesting and more or less plausible, but as the curative procedure about to be described does not depend upon any of them, they need not be further referred to.

Epilepsy is an irregularly periodic disease, similar to some varieties of insanity, hysteria, and several other so-called functional diseases. A period of perfect freedom from disease is followed by a single fit or a number of fits. A semi-somnolent period succeeds the fit, characterised by lassitude and exhaustion. Then comes the period of quiescence, during which changes are taking place in the cerebro-spinal system that will bring about a recurrence of the fits sooner or later.

In the early stages of simple epilepsy an autopsy reveals nothing visual or tangible to the most elaborate investigator. Hence the theories that supply the place of facts.

It seems, however, certain that an epileptic attack is the result of some abnormal nutrition, of some part of the brain or medulla. This abnormal nutrition, not being apparently due to a vascular change or a nervous lesion, may possibly be due to an alteration of the normal relations between the vascular supply and the nervous demand of some part of the brain. In all probability the affected spot may be in any part of the brain. Hence the great differences between the prodromata, the invasion, and the character of the fits in different individuals.

The nature of the irritation may be simply hyper-nutrition of nerve-cells, by which these cells become too active, and produce a disturbing influence on surrounding structures. During the exhaustion of the fit their nutrition is impaired, and time is necessary for them to recover their hyper-excited state. A fresh fit then ensues.

Or the nature of the change may be an alteration of the normal osmosis that ought to exist between nerve-tissue and the blood-stream. An excessive amount of sanguineous fluid may be effused from the vessels, and excite the nerve-tissue of a particular part, or the waste materials of the affected spot may not be carried away with sufficient rapidity, and the epileptic attacks may somehow restore the balance. On either supposition the fit is brewing during the quiescent state.

Or the affected part may be simply hyper-sensitive, and the epileptic attack reduces its sensibility for a certain period.

On all these theories the well-known effect of regulated, unirritating diet on the frequency of epileptic fits can be explained.

Bromide of potassium and belladonna are the most valuable drugs in epilepsy, and they are generally supposed to act upon the disease through their influence upon the cerebral circulation.

From these and other similar considerations it seemed to me probable that cases of simple epilepsy might be cured through more or less permanent diminution of the cerebro-spinal vascular supply.

The medulla is supplied by the vetebral arteries. These arteries do not freely communicate with any others on the medulla, and ligation of one or both would sensibly diminish for a time the vascularity of that part. Indeed, in my first operation, I feared paralysis of the lower extremities or altered cardiac action. Educated in the "sensitive medulla theory," my attention naturally turned to the vertebral arteries. But post-mortem examinations have in some cases shown me that the epilepsy was caused by a distinct lesion in the convolutions, and in the early stage of such cases ligature of the carotid on the affected side might have proved useful. True, the collateral circulation is in the brain almost instantaneously established, but it is conceivable that the force of the blood-stream, its direction and osmotic properties, are changed by the ligation; and one or all of these may be all that is necessary to cure epilepsy. Hence the following operations:—

Case 1.—Josiah R., aged seventeen years, a foundling, had been under my observation since October 17, 1879. He had no fits for the first fortnight after admission. In November he had sixteen fits, and in December he had four fits. During the year 1880 he had 183 attacks. The longest period of freedom from an attack was from the 17th till the end of December. During the first half of 1881 he had 147 fits. During the month of June he had sixty-six fits. During May and part of June he was five weeks free—the longest period of quiescence he has ever known. All this time he was taking a drachm of bromide of potassium daily in three doses, yet the record shows that the disease was getting a stronger hold upon him, and the fits were not only becoming more frequent, but more severe.

The patient had his first fits between the age of fourteen and fifteen years; they were, he supposed, brought on by a fright at school. Nothing is known of his family history.

On July 6, 1881, I tied the left vertebral artery, the patient being anæsthetised by means of chloroform. Beginning about the middle of the clavicular attachment of the left sterno-mastoid muscles, one incision was made outwards along the clavicle for about two inches, and another upwards along the external border of the sterno-mastoid for upwards of two inches. The triangular flap was turned outwards. The sterno-mastoid muscle was very wide, and a portion of the clavicular attachment was cut through, and the muscle retracted inwards. The external and internal jugular veins were also drawn towards the middle line, and the dissection carefully carried down until the outer belly of the omo-hyoid muscle came into view. This was cut across, and turned out of the way. The phrenic nerve now came into view on the outer side of the wound, and the transverse cervical artery was also seen, tied, and cut across. A large vein ran close to it; this was drawn outwards. On clearing the tissue beneath, the large vertebral artery was easily seen and tied. Before tying the vessel the patient was allowed to become sensible, and at the moment of tying, Dr. Stuart, whose hand was on the pulse, told me that it gave a bound, and then went on naturally. The wound was then closed and dressed antiseptically, and the patient put to bed. He slept during the afternoon and evening. At 6 p.m. his temperature was 100·2°. The mixture of bromide of potassium that he had been taking for the past two years was continued.

On July 9 his temperature was normal, and never had risen above 101·2°. Everything went on well till July 15. During the evening of this day his temperature rose to 104°, and next morning some secondary hæmorrhage began to ooze from the wound. The wound was freely opened, and the blood seemed to come from some small veins at the base of the triangular flap. The wound was plugged with oiled lint, and a nurse told off to watch the case specially, with directions how to act until help came. A few recurrences of hæmorrhage occurred afterwards, but these were restrained by pressure until Dr. Forbes came, and it always ceased when he opened up the wound freely. The increase of temperature gradually subsided, until by July 20 it was normal. The wound now filled up readily by granulations. On August 6 the patient was allowed out of bed, and from that until August 21 he gained in flesh and strength. On August 21 he left the hospital, against the wish of the nurse, to go to church, and the excitement of escaping brought on a fit, followed on his return to the wards by another. Next day I sent him to bed and prescribed—℞. Ammoniæ bromidæ ʒj., potassæ bromidæ ʒij., tinct. belladonnæ ʒj., aquæ ad ℥x.,—m.; ℥j. qq.h. Up to August 27 the patient had several semi-hysterical and semi-epileptic attacks. He did not "work" at all in the last four or five, and in several of them he was never unconscious.

From that up to September 28 he was up daily the greater part of the time, walking about and helping the nurse. He even watched different cases for her, and had not a single fit. He believes he is quite cured, and on the above date asked leave to go to New York with a friend who promised to take him. I gave him a bottle of medicine to take with him, the prescription, and discharged him. He promised to write to me as soon as he got over, and from time to time afterwards.

I heard from him on October 27. He has been working since his discharge, and has had no fits.

Case 2.—William W., aged twenty-five, a carter, was admitted to my wards on July 6, 1881. His father was killed by a fall from a horse. His mother is living, and he has had thirteen brothers and sisters. Two of the thirteen died in infancy. No epilepsy in the family. Some years ago (probably five or six), whilst following his occupation as a sailor, he fell from aloft, and hurt his head. He was only slightly stunned. A week afterwards he had a fit, and he was then taken to the Royal Southern Hospital, where he had several. He had no fits previous to the accident on board ship. Latterly the fits have become more frequent and more severe, and when they are severe his left arm "works" and twitches very much. The nurse describes the fits as lasting from five to twenty minutes. The twitchings of the left arm are very severe, and his head is dashed violently from side to side.

On July 6 the left ulnar nerve was stretched, in the upper part of the internal intermuscular septum, for the purpose of relieving the pain complained of there after the epileptic attacks. Bromide of potassium was prescribed. The wound healed without any trouble, and the twitchings were lessened, but the epileptic attacks continued as usual.

On August 17 I ligatured the left vertebral artery by cutting down upon its course. Between the sterno-mastoid muscle and the scaleni muscles there is a depression in the necks of all but excessively stout individuals. Along this hollow, in a direction upwards and outwards, I made an incision about four inches long. The incision began just outside and on a level with the point where the external jugular vein dips over the edge of the sterno-mastoid. The internal jugular vein soon came into view, and was drawn inwards; next a zone of glandulo-adipose tissue appeared, and on tearing through this with a probe or director, the transverse cervical arteries with one or two veins could be seen. These were retracted to the outer side. The wound was now pretty deep, and a good light and careful retraction of the lips of the wound were necessary, as excessive or rough handling might have injured the internal jugular vein on the inside, or the phrenic nerve on the outside; while at a short distance below lay the pleura surmounted by the subclavian vessels and their branches. In this case, when I reached this stage of the operation, and scratched through the fascia covering of the longus colli, no vertebral artery could be seen. I then separated the fibres of that muscle, and came upon it just below its entrance into the spinal canal. The heart did not show any disturbance when the ligature was tied. The wound was washed out carefully with carbolic acid and stitched up completely, drainage-tubes being superfluous in this region, where absorption and union are so rapid that tension does not occur. The operation was almost completely bloodless.

Just after the operation the patient had a fit. During the afternoon his body twitched a good deal, but there was no unconsciousness or other symptom of epilepsy.

When I saw him in the evening he was in great distress. A nurse had put on an elastic bandage to retain the antiseptic dressings in close contact with his neck, and had drawn it so tightly that his chest was gradually compressed until costal respiration was impossible. Removal of the bandage gave him intense relief.

On the 18th and 19th he had two fits. The wound healed up readily and without any elevation of temperature.

I saw him to-day (November 1), and he had not had a single fit since August 19. He has taken the same medicine since the operation that he had taken for some time before the operation took place.

Case 3.—The third case, and the last that I will publish at the present time, was a very unfavourable one.

Cornelius M., aged nine years, an epileptic from birth, first came under my care in September, 1880. He is also idiotic to a certain degree, but would probably receive much benefit from treatment in an idiot asylum. The fits, however, incapacitated him from being received there, and it was without much hope of success that I ligatured his left vertebral artery. Before the operation he had, from his admission in September, 1880, till June, 1881, 161 fits, or, on an average, sixteen fits per month. The operation was performed on July 13, by the same incision as in Case 1. The vertebral artery was very small, and for that reason also success was not expected. The patient turned out very intractable under the dressings, and it was impossible to preserve antiseptic precautions. The temperature went up on the third evening to 103°, and on the 16th it reached 106°. This high temperature did not affect the patient very much. He was quite lively, and very restless. The wound healed readily under the open method, and by July 20 the temperature was normal.

On July 23 the patient was very much excited, and the nurse thought he was going to have some fits; but after 9 p.m. he became quiet, and went to sleep. On July 29 the patient had a fit, the first since the operation. Up to August 9 the patient had six more slight fits, and on August 10 he had several epileptiform attacks during the day. I then sent him to the epileptic ward, as I considered his case hopeless without ligature of some other vessels, and the patient was so unmanageable that I dare not venture on further operation.

I saw him to-day (November 1), and happened to casually inquire as to the number of fits he has had lately. I was surprised and gratified to find that he has not had a single fit since he came down.

In all these cases I ligatured the left vertebral arteries. I have at present in hospital three other cases whose wounds are healed, but whose cases I will not publish for some months. In one I ligatured the left vertebral; in another the left vertebral and the left common carotid simultaneously; and in a third the left vertebral and right internal carotid consecutively. It is interesting to mention here that in the first of the last three the patient became insane after the fits. In some fits he has had since the operation he has not been insane and scarcely unconscious. This patient came under my observation for the purpose of being sent to a lunatic asylum.

I have been induced to publish the first three cases thus early because the effect has been so striking in all, because many medical men have heen inquiring about the matter, and because the publication of the cases will draw attention to the subject, and the rapidity with which the utility or uselessness of the procedure will be proved will be so much greater than if I were to continue to prosecute the subject alone.

It is unfortunate that the operations proposed are so formidable to the *surgeon.* They are, however, in these days of antiseptics, very safe for the patient if undertaken by practical operators. The common carotid artery is easy of access, but not so effectual as the vertebral. The latter is deeply placed, and the place of access to it is surrounded by important structures, accidental wounds of which would be fatal. It is therefore to be hoped that imperfectly performed operations will not bring discredit upon the treatment before its utility is thoroughly tested. The mode of ligature of the vertebral described in Case 2 is the best.

The points to be considered are—

1. Is the effect produced by the operation permanent or temporary?
2. In what kinds of epilepsy is the treatment likely to be most useful?
3. What vessels, if tied, are most likely to affect the disease?
4. To what extent is mental deficiency or idiocy a contra-indication to an attempt to cure epilepsy by this method.

I do not come forward as an advocate of this method, as I do not yet know whether the success may not be accidental. I have simply stated the considerations that led me to the above operations, and their results. At a future time I hope to be able to state more facts, and I am only anxious that some way should be found to successfully relieve the sad condition of the multitude of epileptics in Great Britain.

ON THE

CURE OF EPILEPSY BY LIGATURE OF THE VERTEBRAL ARTERIES.

In a short paper in the *Medical Times and Gazette* for November 19, 1881, I called attention to three cases where epileptic convulsions had ceased after ligature of one of the vertebral arteries. I also hinted at some cases where the carotids had been ligatured, and promised to give further results at a future time. This I had intended to do in July next, when a year would have elapsed since the commencement of these operations; but the results have been so striking, and so many inquiries have been made about the cases already operated on, that it has become absolutely necessary to report at an earlier period the amount of progress that has been made.

The three cases then reported have remained free from fits ever since. The first is engaged in a tea warehouse. The idiot boy has become obedient, observant, and intelligent, and efforts are being made to get him into an idiot asylum as a most promising pupil. The third case, an old hospital bird, has been in and out of hospital on various pretences ever since. He almost regrets his cure, as it lessens materially the facility with which he can obtain admission to hospital. He is at present *in* with a swollen leg.

The case I referred to, where maniacal symptoms appeared after the fits, and sometimes in place of them, and where the maniacal symptoms subsided as well as the fits after ligature of one vertebral, is still in hospital. A relapse took place in this case in regard to both symptoms. The fits, however, were much fewer and less severe, and the maniacal symptoms never rose above *an excited manner,* whereas before they were *homicidal* in their tendency. In this case I have since ligatured the other vertebral artery; no bad effect followed the operation, and both epilepsy and mania quite disappeared. He has lately had one or two slight fits without loss of consciousness, and his mental and physical condition are so much improved that he would not be taken for the same individual.

The hopes then held out with regard to the possible effects of ligature of the carotid were speedily succeeded by disappointment, and the cases thus operated on are waiting until the cerebral circulation has been fully accustomed to its altered circumstances before the vertebrals are interfered with. I see the carotids have been ligatured previously ("Ranking's Abstract," vol. xxxiv., page 58) for epilepsy, and this I only found out within the last few days. My researches have failed to discover that any person has ever suggested ligature of the vertebrals for epilepsy; and I believe ligature of the vertebral was only done once before I performed it, and in that case for innominate aneurism, where the carotid and subclavian arteries were ligatured at the same time.

I will now record the results in a few more cases where the vertebrals have been ligatured, and then reply to some objections that have been made to the operation.

Case 1.—Nicholas M., aged seven years, a slobbering, howling idiot, was brought into the Liverpool Workhouse Hospital by a drunken, nervous, emaciated mother, on November 3, 1881. His father is also dissipated in his habits, but otherwise strong and healthy. The family consists of ten children, another of whom is mentally weak. His fits began when he was a year and eight months old, and have continued with increasing frequency ever since. From his admission on November 3 until November 23, when the left vertebral artery was tied, he had twelve fits (probably some more that were not noticed). The operation was performed by making a linear incision outside the sterno-mastoid muscle and outside the veins that converge to the lower third of the outer border of that muscle. The subcutaneous tissues were next cautiously divided until the finger could be inserted into the loose, fatty tissue that lies inside the scalenus anticus muscle. Upon retracting the sterno-mastoid, with the subcutaneous veins and the internal jugular vein, towards the middle line, the sulcus towards which the vertebral artery runs was exposed. A little scratching with a director exposed the vessel, and ligation was a matter of routine. No bad symptoms followed, although the patient frequently displaced the dressing, as the valvular wound that I now practise in ligature of the artery keeps the depth of the incision undisturbed and unexposed to the air, in spite of the disturbance of the dressing that often takes places in epileptic, and especially in idiotic, patients. On December 5 his senseless howlings had diminished, and he began to take notice of the other boys in the ward. On December 6 he had a slight fit, and on December 20, 21, and 22 he had several fits. On December 28, as a few more fits had occurred since the 22nd, the right vertebral artery was also tied. The wound healed up well, and in a week the boy was running about, with only a small sore at the seat of incision. Up to January 23 he continued free from fits. His drunken mother then refused to pay for him any longer, and took him out. A fortnight after I saw the mother. The child had had no more fits, but he was evidently living in a very neglected condition, and I am afraid his mental state will not improve by reason of the deteriorating influences of his environment. The case was apparently a most hopeless one for operation, and the results obtained in stopping the fits and in clearing the boy's mind are to me as astonishing as they are gratifying.

Case 2.—Margaret O'D., aged seventeen years. She has been an inmate of the epileptic establishment at Dingle Mount, in connexion with the Liverpool Workhouse, for some years. I have been unable to obtain any particulars of her family history or of the cause of her fits, but Dr. Irvine the medical officer to Dingle Mount, has supplied me with the subjoined record of *the fits that have been observed* uring the year 1881 :—

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1st week	1	6	1	2	0	0	3	2	3	4	0	57
2nd week	2	2	1	2	5	0	0	5	4	3	4	67
3rd week	3	2	0	9	2	1	0	3	0	7	2	Sent to workhouse.
4th week	6	4	15	5	11	7	3	0	4	4	27	
Total	12	14	17	18	18	8	6	10	11	18	33	124

Total during year, 289.

The right vertebral artery was tied on December 21, and from her admission until the ligature she had a great number of fits. The wound healed without the slightest rise of temperature, and up to the present time (February 21) she has not had a single fit. Besides the freedom from the fits, her temper, which was very bad, has enormously improved, and except for a little flightiness and "mightiness" of manner, her character has changed remarkably.

Case 3.—George H., aged eighteen years, was admitted into the medical wards of the Liverpool Workhouse on June 17, 1881. His father was then alive; his mother was dead from heart-disease. He suffered from "hydrocephalus" when eighteen months old, and when at school he was struck by a "ruler." These are the only causes to which the disease can be ascribed. He had his first fit at fourteen years of age, and has had them ever since. No record was kept of their number in the medical wards, where every medicinal means was tried. He was admitted to the surgical wards on October 1, and from that until October 12, when the left vertebral artery was tied, he had *thirteen* fits. The wound healed without any circumstance occurring that calls for remark. His first fit after operation occurred on October 28. On November 3 he had another, and during November he had altogether thirteen fits (about half the number that occurred in the same time previous to the operation). On December 8 the right vertebral artery was tied, and on January 14 he was discharged to his home, as no fits had occurred since the operation. Next day, on leaving the hospital, news reached him of his father's death —the only person he had to go to—and the shock was consequently great. During the next few days he had some slight fits. At the present time these weaknesses do not trouble him, and have not for over a fortnight. He expresses himself confidently in the belief that a cure of the fits has taken place; and it is a remarkable fact that the patients have a feeling that a cure has taken place before time has proved it. They tell me "something has left them," or that "they feel quite different from what they did before." The physical and mental improvement are as marked in this case as in the previous ones.

Case 4.—Mary S., aged thirty-one, single, of temperate habits, was admitted to hospital from Dingle Mount on July 30, 1881, suffering from pneumonia and epilepsy. The fits began at the age of two years, after an attack of whooping-cough. They then ceased during childhood, to reappear again at puberty, when she was fourteen years old. Her mother died from fits. No record was taken of the number of fits during the summer, as her chest was in such a doubtful condition that operative interference was considered out of the question. At the beginning of the year her pulmonary disease had completely disappeared, and observations were then made upon the number of fits, when she was found to have as many as six in the week on an average. On January 18 the right vertebral artery was tied. She had one fit the evening after the operation, and no more unti January 30. Up to February 20 she had had four fits altogether since the operation. She was then sent back to Dingle Mount, because she did not wish to have the other vertebral tied, on the ground that she believed the fits were leaving her. I did not press the operation, as I believe the fits will gradually disappear after ligature of one vessel, and in her case full opportunities will be afforded for testing this belief.

Case 5.—Mary E. W., aged twenty-one, admitted to hospital on January 27, 1882. Her father and mother are both alive and in good health. Of the family, four children died of fever, one of "water on the brain," and one of convulsions. Two girls are alive and healthy. The patient has had fits since she was eight years old, through a fright during play. She was, however, sensible till she was eleven years of age, when she fell in the street and cut her forehead. After this she became imbecile, and did not recognise anyone belonging to her. Dr. Irvine sends me the following record of the fits observed during the year 1881:—

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1st week	4	1	5	10	11	9	13	8	13	5	18	15
2nd week	4	3	9	10	12	19	14	5	10	16	10	23
3rd week	5	14	14	9	9	6	6	6	11	10	11	21
4th week	12	7	17	21	21	7	29	18	15	22	16	28
Total	25	25	45	50	53	41	62	37	49	53	55	87

Total during 1881, 582.

From January 27 until the ligature of the left vertebral artery on February 2 she had nine fits. The patient was a stout, flabby person, with a very short neck, and the operation of ligaturing the vertebral was one of no mean difficulty. The wound healed up without any unusual increase of temperature, and she had no fits for a week after the operation, and during the next fortnight she had only seven fits—a decided improvement upon the previous ten months. She is decidedly brighter-looking, and although she does not talk much, yet she looks around her more intelligently. A more hopeless case than this could not be imagined, and yet I believe I shall make something of her.

I have ten more patients under treatment, a report of whose cases I will reserve to a future paper. In three of them I have tied both vertebrals simultaneously, without any bad effects, and in none of these have any fits occurred since. In all, without exception, the amelioration has been decided, whether we have regard to the reduction of the fits or the improvement of the mental powers. No lesions referable to the diminished supply of blood to the spinal cord have been observed, and no deaths have occurred from the operation in any of the cases under my charge.

It has been objected to ligature of the vertebrals that the operation is merely psychological in its effects. "The mind of the patient is fortified by the idea that a cure has been effected, and hence can restrain the fits. On this ground a milder operation would be as effectual." To such an objection I would reply that the idiots operated on had no knowledge either that they had fits or were operated on for them. Many cases of severe burns have been under my care in epileptics, and the fits have occurred in spite of the burns. This fact disposes of another objection, that epilepsy and severe wounds do not co-exist. In some of my most successful vertebral operations the wound healed by the first intention, and I can trace no relation between the efficacy of the cure and the wound-trouble, but decidedly the reverse.

Then, again, it is difficult to understand how ligature of the vertebrals can effect any change, considering the free anastomosis in the cerebro-spinal circulation. This theoretical difficulty is not of much force when arrayed against opposing *facts*. But, even theoretically speaking, the vertebral arteries have few anastomoses, and I have read a paper of Mr. Moxon's somewhere, in which he attempts to show how lesions of the cord may depend on deficient supply of blood through the vertebrals. My operations, I think, prove that he was in error, and that the lesions he refers to depend more on venous congestion than on spinal anæmia. Within the last few days two observations have confirmed this view. I operated on a hopeless epileptic with a partially paralysed right arm, and a deformed and immovable hand and wrist. A few days after, he called my attention to his hand, which he could move with a facility such as he had not done for years. Another patient, upon whom I operated with my friend Dr. MacDonnell about a fortnight ago, was afflicted with a peculiar stiffness of articulation and a slowness in getting out the words. I saw him on the same day on which I witnessed the mobility of the wrist. The improvement in his articulation was so decided as to have already attracted the attention of his attendants and fellow-patients. Now, to what could this have been due but the relief of the pressure of passive congestion ? The suggestion here offered I intend to follow up in my wards in the treatment of chronic diseases of the spinal cord in other than epileptic cases, but further notice here would be premature.

There is a physiological observation I would here mention, and which I have purposely kept to the last. When the vessel is ligatured the pupil on that side becomes contracted. In the majority of cases this contraction maintains ; in Mary S.'s case it is still distinct. When the opposite vertebral is ligatured, the opposite pupil contracts and the pupils again become equal. No interference with sight occurs, and in some unilateral ligatures the contraction passes off. The inferior cervical ganglion rests upon the vertebral, and sends branches along this vessel. These branches are included in the ligature, and somehow affect the pupil. Or is the pupil affected by a change in the circulation at the base of the brain?

The less I say at the present time, the less shall I have to retract in the future. I can, however, now say that ligature of the vertebrals has a decided effect upon the mental condition of epileptics and upon the number of the fits in epilepsy, and I can strongly advocate the operation where other means have failed, and where the fits are so numerous as to interfere with the patient's usefulness or with his mental powers. I have tried it now in hereditary cases, in epilepsy following scarlet fever, blows, fright, and in cases where no cause could be ascertained. In all the effect was beneficial, and mostly curative as far as time has allowed us to judge.

A NEW METHOD OF TREATING INVETERATE AND TROUBLESOME DISPLACEMENTS OF THE UTERUS.

THE cure of uterine displacements by operative methods is never entertained in cases where the malposition is recent and can be rectified by reposition and rest, or by instrumental appliances that do not distress the patient. There are, besides the cases included in the above-mentioned category, a great number of others whose lives are a torment to them by reason of the inefficiency or irritation of pessaries. The fact of every gynæcologist of any note using a pessary or pessaries of his own invention proves that all but the most recent and untried ones are often ineffectual. Many women, again, have a natural dislike to wearing such instruments, and to the periodical re-adjustments which their use necessitates; and, although the misfortune of displacement is in them permanently palliated by the pessary, they would willingly undergo any reasonably safe operative procedure that would be likely to release them from manipulations so distasteful to them. Such an operation is that which I now intend to describe.

Before I thought of it, I performed the only operation hitherto described for prolapse of the uterus, in which the vaginal canal is contracted and the perineum fortified by means of plastic operations that are as numerous as the operators themselves. Although these operations do good in a certain number of cases, their success depends on the absence of all dilating causes. The external dilating causes *can* be abstained from, but *are* not; whilst the internal causes are always at work, and hence in the very worst cases, where operation is most necessary, the result is the least satisfactory. I have performed several operations by the old method, and only in one was I quite successful, after the lapse of three months. In that case I had to modify the operative methods of preceding operators in a radical and useful way; but as since that time I have devised a better method, applicable to all cases, I will not refer to the case further.

My method of operation was led up to by several considerations of an anatomical character, which I will first refer to.

In the performance of gynæcological operations on the cervix uteri it is a well-known fact that even the virgin uterus can be drawn down with forceps until the os presents just inside the labia. The multiparous uterus can be extruded further and with much more ease. The resistance to further extrusion arises from the peritoneum connecting the uterus to other organs, and from the broad and round ligaments. The round ligaments do not resist the extrusion of the uterus so much as the other structures. Their special function I will in a moment mention.

The force required to pull down the uterus is very small, and far inferior to the pressure of the abdominal contents upon the pelvic outlet during straining. We know how peritoneum can stretch or yield in hernial protrusion, so that if the perineum and the support of the vaginal walls were the only obstacles to prolapse of the uterus, prolapse would be the rule, and not the exception. In other words, if the uterus were an intrapelvic wedge, so placed as to be supported only by the vagina and perineum, and its axis so directed that the intrapelvic pressure could act upon its fundus in the direction of the vaginal canal with the greatest available force, no woman could be found with her uterus unprolapsed.

The uterus, when in the normal position, is scarcely subjected to any force that tends to produce protrusion. The sacrum and coccyx bear the greater part of the pressure in one direction, and the pubic bones bear the pressure in another direction. Whatever maintains the uterus in this normal position is the great preventive of prolapse. For the virgin uterus, the natural resilience and coaptation of the surrounding organs is probably sufficient; but when these fail, the *round ligaments* are the chief agents. These ligaments are "attached to the upper angles of the uterus, one on either side, immediately in front of the Fallopian tube. From this point each ligament proceeds upwards, outwards, and forwards, to gain the internal inguinal ring; and after having passed, like the spermatic cord in the male, through the inguinal canal, reaches the fore part of the pubic symphysis, where its fibres expand and become united with the substance of the mons veneris. Besides areolar tissue and vessels, the round ligaments contain plain muscular fibres, like those of the uterus, from which, indeed, they are prolonged."—(Quain.)

These ligaments, so placed as to manifestly prevent backward or forward swaying of the fundus uteri, are unfortunately subject to stretching, as nearly all soft tissues are, provided the force be persistent enough. This force arises in repeated pregnancies, uterine congestions, and from other causes well known to gynæcologists, that change the position of the uterine wedge, and overcome the *staying* force of the round ligaments by stretching them. If complete retroflexion or retroversion takes place, prolapse is not so serious; but it is when the retroversion is partial, when the uterus comes more into a line with the axis of the pelvic outlet, that the pressure of the abdominal contents acts with most efficiency, and with a persistence that is certain to produce protrusion, if not complete prolapse.

If we could replace the uterus, and maintain it when replaced in its normal position and direction, we should at once take away its tendency to prolapse. We cannot easily increase the resiliency of the surrounding tissues, but we can do what my operation consists in, and that is, *"pull out the slack of the round ligaments."*

The operation is performed by cutting down upon each abdominal ring, gathering up the ends of the ligaments, freeing each from its nerve, and gradually releasing them by patient and cautious traction from the neighbouring tissues, until the position of the uterus, as ascertained by the finger in the vagina, satisfies the operator. The ligament is then stitched to the tissues around the ring, and the loose ends attached to each other or rolled round two pieces of wood, which are fastened together in the middle line. The picking up of the ends of the ligament is the *difficult* point, and the freeing of the ligaments from their surroundings is the *delicate* point, but by experience both can be performed easily and effectually. The ligament slides within its sheath, and the peritoneum is not disturbed. No risk of hernia or of pelvic inflammation occurs. Beyond some pain for the first few days, the operation is harmless if carefully performed, but experiments on the dead subject have shown me that danger may arise from incautious operators.

Case 1.—Elizabeth C., aged thirty-eight, a well-nourished woman of medium stature and relaxed pelvic organs, was admitted into the Liverpool Workhouse Hospital, suffering from prolapse of the uterus to such an extent that the cervix presented outside the labia.

On October 4, 1882, I performed the vaginal operation, and narrowed the vagina to a finger's width. On December 1 the uterus did not appear externally, but was pressing forcibly downwards upon the narrowed vagina. The bladder and rectum were bulging forwards and backwards as if all these organs were endeavouring to escape by the vaginal outlet. The dragging pains that the woman suffered from were unabated, and the only improvement was that we did not see the uterus with the naked eye when the vulva was exposed.

On December 14 I performed my operation on the round ligaments. Two inches of the slack of each were pulled out and cut off, and the ends stitched by numerous catgut sutures to the boundaries of the wounds.

On January 6 the wounds were quite healed, and a dimple in the centre of the cicatrix showed where the ligaments had formed their attachments.

The patient complained of some pain during the first two days. This was relieved by morphia injections. I examined the patient on February 27 in the erect position. The uterus remains fixed in the position into which it was drawn at the time of operation. Coughing and straining does not tend in the least to produce prolapse. The cervix merely sinks a little downwards and forwards in the direction of a normal uterus, but not quite so much as a normal multiparous uterus would sink. The reason of this is that the ligaments have been made more "taut" than the normal ligaments ever are; and this increased support is necessary where these ligaments only have to be depended upon. The vaginal walls are still relaxed, but not so much as at the time of operation, and it is to be expected that, when the dilating wedge is removed, the stretched tissues will recover somewhat of their former resiliency if the stretching process has not already gone too far.

The dragging pains have left her completely, and the woman is quite at liberty to rejoin her husband. Pregnancy is not an event likely to occur in the present case, or in many of the cases upon which operation for prolapse is necessary. But if it should occur, one of three things might happen—the curtailed ligaments might refuse to allow the uterus to rise into the abdomen, and abortion would result; or the ligaments might stretch sufficiently to allow the uterus to rise, and might recover their tone after the birth of the child; or they might fail to recover their tone after delivery, and the prolapse would recur.

When cohabitation has been provided for, the chief object has been attained, and the superiority of the present operation over all others vindicated. Pregnancy completely destroys the results of the lower operation, and, theoretically speaking, it may not destroy the results of this the higher operation.

Case 2.—Bridget K., aged forty-five, was admitted to hospital on January 15, 1882, with chronic prolapse of uterus and bladder, from which she had suffered for many years. She was operated on on February 1, and two inches of the slack of the round ligament pulled in. This patient had an attack of bronchitis, induced by ether, upon the chronic form of the disease, from which she has suffered for some time. The constant coughing increased the pain of the wounds, and her temperature ran up to 101° during the first three days. The wound did not heal by the first intention, but granulated. On February 20 the wounds were healed and the uterus fixed in the position in which it was placed at the time of operation. On February 27 the results are the same as in the preceding case. The pressure of straining does not affect the uterus, and the maintenance of the cure is certain.

Bronchitis is a barrier to the performance of the operation, from the pain produced by the coughing, and where there is any tendency to it I would recommend the use of chloroform in preference to the use of ether.

Case 3.—Ellen T., aged twenty-eight, has had a prolapse of the uterus and anterior vaginal wall for several years. She has been in and out of hospital for the last year and a half, and treated without effect by various kinds of pessaries. I had contracted the anterior vaginal wall without effect, and was about to operate on the posterior vaginal wall